Competitiveness: the role of FDI and structural change

by

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Internship Report in Economics

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Biographic note

Rita Pinto was born in Porto, Portugal, in March 1994. In 2012, she started the Bachelor's degree in Economics at the School of Economics and Management of the University of Porto (FEP-U.Porto), which she completed in 2015. Right after graduating, she enrolled in the Master's degree in Economics at the same school and university, which she is currently finishing. As part of the Master's degree, she did a curricular internship at aicep Portugal Global between October 2016 and February 2017 focused on the attraction of FDI projects, in the Corporate & Finance department.

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Abstract

Growing foreign direct investment (FDI) flows are one of the driving forces of the globalization process, and its main consequence at the same time. The aim of this internship report is to determine the impact of FDI inflows and structural change on host countries' competitiveness. Indeed, countries are increasingly competing with each other in international markets (*e.g.*, for the attraction of investment). This topic is particularly relevant for the host institution of the internship – aicep Portugal Global. The internship comprised the analysis of the competitiveness factors of Portugal in the attraction of FDI. The data gathered in the internship was used to estimate a balanced panel data model for the 28 EU countries, over the period 2002-2014, to analyze the influence of FDI inflows and structural change variables on host countries' competitiveness. The results show that FDI has a negative, even though low, estimated impact on countries' competitiveness, regardless of the variable used to measure competitiveness (*i.e.*, productivity and the Global Competitiveness Index). On the other hand, structural change variables reveal a positive estimated effect, namely concerning the transference of resources, capital accumulation (human and physical), and technology and innovation.

JEL codes: C23, F21, F43, F61, F62, F63, O33.
Keywords: FDI, competitiveness, structural change, economic development.

Resumo

Os crescentes fluxos de investimento direto estrangeiro (IDE) são uma das principais forças do processo de globalização, e, simultaneamente, a sua principal consequência. O objetivo deste relatório de estágio é estudar os potenciais efeitos que o IDE e a mudança estrutural podem ter na competitividade dos países. Efetivamente, os países competem cada vez mais uns com os outros nos mercados internacionais (por exemplo, na atração de investimento). Este assunto é particularmente relevante para a instituição onde o estágio foi realizado – aicep Portugal Global. O estágio compreendeu uma análise dos fatores de competitividade de Portugal na atração de IDE. Os dados recolhidos durante o estágio foram usados para estimar um modelo de dados em painel para os 28 países da UE, ao longo do período 2002-2014, de forma a analisar o impacto dos influxos de IDE e das variáveis de mudança estrutural na competitividade dos países recetores. Os resultados demonstram que o IDE tem um impacto estimado negativo, embora este seja de reduzida dimensão, na competitividade dos países, independentemente da variável considerada para medir competitividade (*i.e*. produtividade e o *Global Competitiveness Index*). Por outro lado, as variáveis de mudança estrutural, nomeadamente a transferência de recursos, a acumulação de capital (humano e físico), e a tecnologia e inovação, revelam ter um efeito estimado positivo na competitividade dos países.

Códigos-JEL: C23, F21, F43, F61, F62, F63, O33.
Palavras-chave: IDE, competitividade, mudança estrutural, desenvolvimento económico.

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Chapter 1. Introduction

In an increasingly globalized economy, in which countries are highly dependent on each other either because of international trade or investment, foreign direct investment (FDI) has gained importance for both developing and developed countries (Julio *et al*., 2013). In addition, there is a common acceptance among many economists (*e.g*., Alfaro *et al*., 2006) that FDI generates positive impacts on the economies of the host countries. Notwithstanding, the benefits and costs of FDI rise great controversy in the field of development economics (Todaro and Smith, 2015), as the FDI's contribution to economic growth is dependent on the absorptive capabilities of the host country (*e.g*., human capital and advanced technologies) (Borensztein *et al*., 1998).

Furthermore, countries are increasingly competing in international markets (*e.g*., for attracting investment) (Anastassopoulos, 2007), and their ability to do so is defined as countries' competitiveness (Narula and Wakelin, 1998). Indeed, many governments now follow a strategy of national competitiveness for fostering economic development (Lall, 2001; Ketels, 2006; Berger, 2008), even though they often disagree about the ways to achieve it (Delgado *et al*., 2012).

Whereas governments commonly disagree on how to achieve a higher competitiveness, an underlying problem is still unsolved, as the definition of competitiveness is not clear among academics and has raised great controversy over the years (Fagerberg *et al*., 2007).

Competitiveness may be defined at both the firm and country levels. At the firm, or micro level, competitiveness has a relatively clear meaning and refers to the capacity of firms to compete, grow and be profitable in the marketplace (Bristow, 2005), so that according to Porter (1990), firms' competitiveness is simply a proxy of productivity. However, defining countries' competitiveness is much more complicated than defining firms' competitiveness, because countries cannot simply just go out of business like companies (Krugman, 1994). Among the fierce discussion on the concept of countries' competitiveness, we find the definition proposed in the Global Competitiveness Report 2016-2017 (Schwab and Sala-i-Martin, 2016) to be an acceptable one. According to the authors, competitiveness can be defined as *"(...) the set of institutions, policies and factors that determine the level of productivity of a country"* (Schwab and Sala-i-Martin, 2016, P. 35).

The impact of FDI in economic development and countries' competitiveness gain more importance in the current economic scenario. The crisis in the subprime

mortgage market in the United States, in the late 2007, quickly transformed itself into a global financial crisis (Clarke *et al*., 2012). It had severe impacts worldwide, but in Europe its impact was even more challenging as it paved the way to a sovereign debt crisis that put the monetary integration under risk (Yilmaz, 2016). The impact has, undoubtedly, been stronger in the peripheral European countries, which has exacerbated a structural problem of competitiveness embedded in the way in which the European Monetary Union (EMU) was originally planned and implemented (Talani, 2015). The sovereign debt crisis started in Greece in May 2010 but was rapidly expanded to all the members of the so-called GIIPS group (Greece, Ireland, Italy, Portugal and Spain).

In fact, Portugal is still facing some negative effects of the recent financial and debt crises, recording until recently high levels of unemployment, low GDP growth and high external indebtedness (De Sousa *et al*., 2014; Lin, 2016). Furthermore, the Portugal case is even aggravated by the failed efforts at fiscal discipline and loss of competiveness experienced by the country during the first decade of the 21st century (De Sousa *et al*., 2014). Therefore, there is an urgent need for stimulating the economy in order to attain higher levels of productivity and employment.

Besides investment, and foreign investment in particular, it is important to further consider that structural change, *i.e.* changes in the structure of production and employment (McMillan *et al*., 2014), is believed to trigger improvements in countries' productivities (Lewis, 1954; Abramovitz, 1986; McMillan and Rodrik, 2011). According to McMillan and Rodrik (2011), productivity improvements occur because of the movement of labor from low-productivity activities to high-productivity ones, capital accumulation or technological change. Following Porter (1990) and Delgado *et al.* (2012), who define competitiveness as a proxy of productivity, then structural change, as well as innovation (*e.g.* Rodrik, 2007) may induce improvements in countries' competitiveness.

Thus, the main research question to be analyzed in this report is how FDI and the different structural change dimensions can play a role in the promotion of competitiveness. This is a rather important topic because, as stated above, countries are increasingly competing with each other and governments are considering competitiveness' improvements as a way towards economic growth and development. Additionally, the influence of both structural change's dimensions and FDI on competitiveness has not been clearly discussed in the literature, so that this study aims at contributing to this gap. Moreover, this topic is highly relevant for the host institution

of the internship – aicep Portugal Global, the Portuguese Trade and Investment Agency, whose main activities are the attraction of foreign investment and the support of Portuguese firms' exporting activities. The internship comprised the analysis of the competitiveness factors of Portugal in the attraction of FDI, such as the macroeconomic environment, infrastructures, labor market characteristics, human capital and business environment (*i.e*. absorptive capabilities). The main goal was, thus, to produce a document that contributes for enhancing Portugal's competitive advantages for the attraction of FDI to be provided to potential investors.

The ultimate goal of this internship report is to assess the role of FDI and structural change on host countries' competitiveness. For that purpose, part of the information gathered and worked in the internship is used to estimate a balanced panel data model for the 28 EU countries, over the period 2002-2014. Indeed, the majority of the empirical studies conducted in this field consider only developing countries (*e.g*. Borensztein *et al*., 1998; Bakardzhieva *et al*., 2010) or both developing and developed economies (*e.g*. Li and Liu, 2005; Woo, 2009; Delgado *et al*., 2012; Álvarez and Marin, 2013; Krammer, 2014; Iamsiraroj and Ulubasoglu, 2015; Iamsiraroj, 2016), thus analyzing a different sample from the one of the present study, which considers mainly developed countries.

The econometric model assumes as the dependent variable the countries' competitiveness, for which two different measures are considered: GDP per person employed as a proxy for productivity, and the Global Competitiveness Index (GCI) produced by the World Economic Forum (WEF). The explanatory variables considered are FDI inflows and variables that assess structural change, which are divided into three different dimensions, namely: i) the inter-sectorial transference of resources; ii) the capital accumulation; and iii) technology and innovation.

This work is organized as follows. The next chapter reviews the literature regarding FDI, structural change and economic development. Chapter 3 presents a literature review and an analysis of the empirical studies integrating FDI, structural change and competitiveness. Chapter 4 describes the internship and the host institution. Chapter 5 comprises the empirical analysis explanation and the estimation results obtained, and, finally, chapter 6 presents the conclusions.

Chapter 2. FDI, structural change, economic development and competitiveness

In this chapter it is presented a literature review regarding, firstly, FDI and its effects on host countries, followed by the analysis of, structural change and economic development, and, finally, a review of the literature concerning the definition of national competitiveness.

2.1. FDI and the impact on the host country

International economic activity increasingly involves foreign production and intra-firm trade by multinational companies (MNCs), enhancing the importance of international transfers in the global economy (Markusen and Venables, 1998; Iamsiraroj, 2015). FDI is one of the most important components of such transfers, being critical to the formation of capital in both developed and developing countries (Júlio *et al*., 2013; Iamsiraroj, 2016). Growing FDI flows are a significant factor of the globalization process, being one of the driving forces of globalization, and its main consequence at the same time (Pekarskiene and Susniene, 2015). Moreover, there is a common acceptance among many economists (*e.g*., Alfaro *et al*., 2006) that FDI generates positive impacts on the economies of the host countries. Actually, most countries target to attract FDI into their economies as they expect that additional stable resources in the host countries can stimulate productivity and economic growth (Iamsiraroj, 2016).

The benefits and costs of FDI have been vividly discussed in the theoretical literature for many years, and rise great controversy among many economists (Todaro and Smith, 2015). Two great opposing views regarding FDI effects on host countries arise from the neoclassical and endogenous growth models. In the neoclassical growth model, long-run growth is only possible through technological progress and/or labor force growth, these two known as exogenous variables (Li and Liu, 2005). De Mello (1997) included FDI in this framework because he considered that it could stimulate economic growth by promoting technological progress. In this sense, according to this first growth model, FDI promotes economic growth by increasing the volume of investment and/or its efficiency. On the other hand, in the endogenous growth model, capital is introduced in the form of human capital accumulation and R&D, and the externalities from these types of capital. Therefore, in the endogenous growth model,

FDI is expected to promote economic growth by generating technological diffusion from more advanced economies to the host country (Li and Liu, 2005).

The neoclassical trade theory enhances the direct effects of FDI on factor rewards, employment and capital flows, while those following the industrial organization approach put more emphasis on potential effects or externalities from FDI inflows. In the industrial organization approach, FDI is seen as a channel to stimulate growth in the host country, given that it can complement the domestic capital formation that may be insufficient in the recipient economy. FDI can also accelerate domestic human capital accumulation through know-how and spillovers, and thereby acts as a positive force for growth.

Indeed, in comparison to other sources of capital, FDI may prove to be better because it provides the host country with a relatively more stable flow of funds and helps augmenting productive capacity, while increasing employment and trade (Iamsiraroj and Ulubasoglu, 2015). But many economists argue that the real importance of FDI to the host countries lies in the fact that it does not only correspond to capital inflows, but rather to a package of tangible and intangible assets such as advanced technology, know-how, skills, brand names, organizational and managerial practices, access to markets, competitive pressures, and environmentally sound technologies (Zhang, 2014).

Furthermore, Zhang (2014) considers the important role that FDI might have for host countries to raise their industrial performance. Similarly, Javorcik (2004) argues that, even though FDI may have an important role regarding capital inflows, introduction of new technologies, marketing techniques and management skills, the real benefit from FDI is its contribution to the improvement of productivity and competitiveness of the domestic industry. In this sense, FDI may accelerate a country's industrial competitiveness in several ways.

First, FDI introduces new products, processes and practices, which may increase host-country stock of ideas that, in turn, stimulates innovation. Second, multinational enterprises may contribute to the improvement of the productivity of local firms through backward and forward linkages. Despite the additional competition induced by the arrival of a FDI project, which may damage local industries, competition in one sector may be beneficial to other sectors (Markusen and Venables, 1998). Regarding backward linkages, multinationals can promote improvements by providing technical assistance and information, by facilitating innovations and production upgrading, and by helping

local firms in purchasing raw materials and intermediate goods. Forward linkages may, in turn, benefit local distributors from the marketing and knowledge of multinational corporations, or downstream firms that can use higher-quality and lower-priced intermediate goods in their own production process (Zhang, 2014). According to Javorcik (2004), though, technology spillovers from FDI are more likely to take place through backward linkages, as MNCs benefit from transferring knowledge to their local suppliers, but have an incentive to prevent information diffusion that may enhance local competitors' performances.

Third, by establishing R&D facilities, MNCs may contribute to a greater local capacity to generate knowledge. Fourth, domestic firms may upgrade their own production methods by learning through watching MNCs' superior technologies and also due to the increased competition in the market because of the entry of MNCs, which may force local firms to improve and upgrade their technology. Lastly, when employees previously employed and trained by MNCs move to local firms, they bring with them the knowledge and skills transmitted by the foreign company (Iamsiraroj and Ulubasoglu, 2015). Markusen and Venables (1998) show that FDI inflows lead to the development of local industries, which may become so strong as to reduce both the relative and absolute position of multinationals in the industry.

Besides the impact FDI may have on industrial competitiveness, it can also contribute to a country's economic growth in other several ways. For instance, Borensztein *et al*. (1998) assessed the crowding-out effect possibility, but in the end they were able to conclude that FDI is an important vehicle for the transfer of technology, and that it is associated, even though not significantly, with a crowding-in effect on the domestic investment, which was also found by Farla *et al*. (2016).

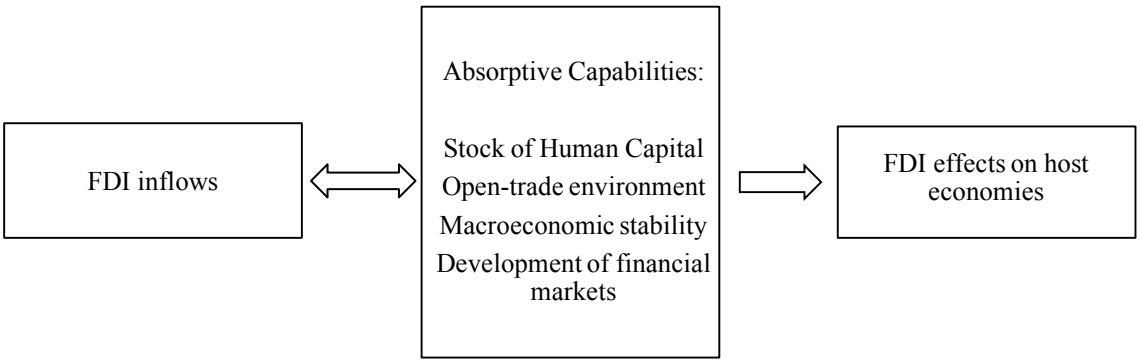
According to Markusen and Venables (1998) as well, the diffusion of technology plays an important role in the economic development of a country, and FDI is considered to be a major channel for it, especially through a 'contagion' effect from the more developed technology and management practices used by foreign firms.

Alfaro *et al*. (2006) also consider the potential positive externalities that may be generated by FDI through the adoption of foreign technology and know-how, and enhance the important role that can be played by this type of investment in modernizing a national economy and promoting economic development. Another example of the FDI's contribution to growth is found by Júlio *et al*. (2013), who consider the impact that FDI may have in the balance of payments of host countries, given that multinational

firms have, generally, a greater propensity to export than do domestic firms (*e.g.*, Dunning, 2012). Yazdan and Hossein (2013) also show that the accumulation of FDI contributes positively and significantly to the productivity growth but only for developed countries. In their opinion, this happens because they consider local structures, institutions and capital endowments, as well as the absorptive capacity of a country, to be determinants for a host country to take advantage of FDI.

Regardless of all these possibilities for increasing host countries' industrial competitiveness, FDI's positive impact on them is not a guaranteed outcome. In order for FDI inflows to induce industrial competitiveness improvements and economic growth, the host country must have certain absorptive capabilities (Markusen and Venables, 1998; Zhang, 2014), which are highly dependent on the stock of human capital (Borensztein *et al*., 1998). The absorptive capabilities are further highly dependent on an open-trade environment and macroeconomic stability (Balasubramanyam *et al*., 1996), and also on the development of the financial markets (Alfaro *et al*., 2006). Interestingly, besides determining the extent to which FDI impacts on the host country's economic growth and development, the absorptive capabilities of a certain country also define the attractiveness of a country in attracting FDI (Figure 1). Rational investors would definitely consider factors such as the level of human capital, macroeconomic stability and the development of the financial markets before investing in a country (Iamsiraroj and Ulubasoglu, 2015).

Figure 1. The role of absorptive capabilities on the process inherent to FDI flows



Source: Own elaboration.

According to Todaro and Smith (2015), there are, in fact, several arguments against FDI, namely that MNCs may lower domestic savings and investment rates by, for instance, substituting private savings, repressing competition, failing to reinvest much of their profits in the host country, and inhibiting the expansion of local firms. Indeed, foreign investment may decrease national welfare because of the transference of capital returns to foreigners (Reis, 2001), as the negative effect of profit repatriation is strong (Latorre *et al*., 2009). Technological diffusion may also be difficult to spread if MNCs do not want to share with local industries their advanced technology in order to maintain a status of technological monopoly (Zhang, 2014).

MNCs also raise a large fraction of their capital locally in the host country, and this may lead to some crowding out of domestic investment, as Morrissey and Udomkerdmongkol (2016) find. Borensztein *et al*. (1998) consider that the effect of FDI on domestic investment can have either sign. By providing complementarities in production or by increasing productivity through spillovers of advanced technologies, FDI may support the expansion of domestic firms, but, by competing in product and financial markets with local firms, MNCs may "kill" them (Zhang, 2014). Crespo *et al*. (2009) evaluate FDI spillovers and find that horizontal externalities have a negative impact associated, which they consider to exist due to the competition effect. Reis (2001) also consider that the fact that foreign investors introduce new goods in the economy at a lower cost than do domestic firms implies that domestic producers may no longer be able to act in the R&D sector. According to Iamsiraroj and Ulubasoglu (2015), FDI might also induce crowding out effects by diverting scarce resources away from other productive sectors. For example, governments may need to invest in infrastructures in order to attract FDI, which might increase foreign debt and distortionary tax burden.

Moreover, even though MNCs may contribute to public revenue in the form of corporate taxes, their contribution may not be that significant as a result of liberal tax concessions, the practice of transfer pricing, excessive investment allowances, disguised public subsidies, and tariff protection provided by the host government (Todaro and Smith, 2015). In addition, Iamsiraroj and Ulubasoglu (2015) find that FDI may generate distortions in the domestic economy.

The management entrepreneurial skills, ideas and technology provided by MNCs might have little impact on the host countries and may, in fact, inhibit their development by preventing the growth of local entrepreneurship as a result of the

MNCs' dominance of local markets. In addition, even though FDI is likely to increase the long-term rate of productivity growth of domestic firms, in the short-term it may decrease their productivity (Liu, 2008). According to Girma (2005) the improvement in productivity due to FDI increases with absorptive capacity but only until some threshold level beyond which it becomes less pronounced, and there is also a minimum absorptive capacity threshold level below which productivity spillovers from FDI are insignificant or even negative.

There is also a possibility that the presence of foreign firms promotes a creative destruction effect, which is supposed to increase with the degree of substitutability between the foreign products and the domestic ones already produced (Reis, 2001). It is important to note that technology transfer is a costly process, given that scarce resources must be allocated to learning (Liu, 2008).

It is, therefore, extremely important to assess both positive and negative effects of FDI on host economies. Whereas the governments of less developed countries aim at attracting FDI because they strongly believe that it induces economic growth, the ones of developed countries appear to be more cautious (Zilinské, 2010). Besides, the sign of the FDI impact is dependent on its form, namely the type of FDI, sector, scale, duration, location of business, density of local firms in the sector and others (*Ibid*).

In summary, and following Abebe and Begum (2016) that produces an overall scheme regarding the effects of FDI and MNCs on the host country, these effects can be classified as direct and indirect. The direct effects are the capital formation and the creation of employment, while the indirect effects refer to the spillover ones, which are expected to consist in transferences of technology, knowledge, operational skills and marketing skills. Accordingly, this spillover is achieved through processes of demonstration, imitation, linkage, mobility and competition, and may produce effects in terms of absorptive capabilities, R&D practices, technology gaps, investment policies and in the free movement of employees. The spillover may, then, be reflected on the levels of productivity, on the access to foreign markets and on innovation, and may produce, as just seen above, positive as well as negative or neutral effects.

Table 1 summarizes the literature contributions regarding the potential effects that FDI inflows may generate on host economies.

Table 1. FDI effects on host countries: a summarising framework

Positive	Direct	Employment Creation			Iamsiraroj and Ulubasoglu (2015)
		Capital Accumulation			Abebe and Begum (2016)
	Indirect	Trade Increase: Impact on the Balance of Payments			Júlio *et al*. (2013)
		Advanced Technologies			Alfaro *et al*. (2006)
		Brands			Zhang (2014)
		Access to markets			
		Domestic firms productivity improvements	New products, practices and processes	Increase in the host-country of the stock of ideas (innovation)	
			Backward and Forward linkages	Technical assistance and information	Markusen and Venables (1998); Javorcik (2004); Zhang (2014)
				Facilitation of innovation and production upgrading	
				Help in purchasing raw materials	
				Marketing and knowledge	
			Establishment of R&D facilities	Greater local capacity to generate knowledge	Zhang (2014)
			Learning by watching MNCs' superior technologies		
			Competition Pressures	Push local firms to improve and upgrade their technology	
			Training Employees	Bring to local firms advanced knowledge and skills	Iamsiraroj and Ulubasoglu (2015)
		Crowding-in effect on domestic investment			Borensztein *et al*. (1998); Farla *et al*. (2016)
Negative	Crowding-out effect on domestic investment				Todaro and Smith (2015); Iamsiraroj and Ulubasoglu (2015); Morrissey and Udomkerdmongkol (2016)
	Increase of competition: inhibition of entrepreneurship and of domestic firms' expansion				Zhang (2014); Todaro and Smith (2015)
	Failure to reinvest profits in the host country				
	Difficult technology diffusion				

Source: Own elaboration.

2.2. Structural Change and Economic Development

The process of economic development entails changes in the structure of production and employment (McMillan *et al*., 2014), more commonly known as structural changes. These changes might result either from sectorial differences in productivity growth or from sectorial differences in the income elasticity of demand (Foellmi and Zweimuller, 2008).

In Table 2, the main seminal contributions, and some recent ones, to the literature of economic development that enhance the role of structural change and innovation, both of structural and neoclassical approaches, are presented. Over the years, many authors have explored the causes and tried to define structural change. Whereas Rostow (1959) considers that it is the result of political, social and economic forces due in a five-stage process and Foellmi and Zweimuller (2008) define it as a process motivated by the evolution in the hierarchic nature of wants, the majority of the authors defines structural change as merely the transference of labor from a low-productivity sector to a high-productivity one (*e.g.* Lewis, 1954; Kuznets, 1973; Abramovitz, 1986; McMillan and Rodrik, 2011). In addition, structural change is believed to trigger improvements in countries' productivities (Lewis, 1954; Abramovitz, 1986; McMillan and Rodrik, 2011). According to McMillan and Rodrik (2011), productivity improvements occur because of the movement of labor from low-productivity activities to high-productivity ones, capital accumulation or technological change. However, it is important to note that productivity growth rates vary inversely with productivity levels (Abramovitz, 1986), which means that countries technologically backwards are able to generate growth more rapidly than more advanced countries.

According to Rostow (1959), economies start the process of structural change as a traditional society with limitations on productivity and, thus, with a high proportion of resources devoted to agricultural activities, and then undergo a 'pre-conditions' phase. In this stage, the investment increases, the scope of commerce, both internal and external, widens and modern manufacturing industries start to appear, all of these strongly motivated by foreign presence. In the next phase – the 'take-off' stage -, the investment and saving rates further increase, new industries expand rapidly generating high profits that are then reinvested, the new class of entrepreneurs expands and new techniques are spread in both agriculture and industry. The fourth stage corresponds to the 'drive to maturity' phase in which economies are able to introduce modern

technologies, thus strengthening its technological and entrepreneurial skills to produce whatever they want to. Finally, in the 'age of high mass-consumption' phase, there is a change towards the production of durable consumers' goods and services.

Differently, Lewis (1954) focus on the transference of labor from one sector to another, by considering a simple dual-economy model with unlimited supply of labor, in which labor shifts from the traditional sector to the modern one. In Lewis' perspective, this is possible because capital becomes available and is applied in traditional activities so that more workers can be transferred to the modern sector, and, as workers are allocated to more productive activities, the output rises. The modern sector cannot, however, expand indefinitely, so that when the labor surplus is exhausted, wages begin to rise and a mass immigration from surrounding countries with labor surplus is expected, as well as an export of capital. These effects may reduce the capital formation in the home country, thus, keeping wages down.

Furthermore, structural change is intimately related with economic growth. Kuznets (1973) suggests six characteristics of economic growth, with one of them being a high rate of structural change of the economy. Indeed, structural transformation entails the shift away from agriculture to non-agricultural and then away from industry to services, which, in turn, requires a change in the scale of production facilities and a shift from personal companies to economic firms, with a related change in the occupational status of labor. Chenery and Syrquin (1989) depart from this perspective and investigate the association of the economic structure and the level of income through the analysis of development patterns based on resource allocation or industrialization, and they found the relationship to be significant.

Table 2. Main contributions on the literature of development economics focusing on structural change

Structural Approaches				Neoclassical Approaches	
Seminal contributions		Recent contributions			
Nurkse (1952)	Balanced growth induced by sectorial differences – structure of output needs to match the structure of domestic demand, which is only possible through a planned industrialization that enables the appropriate distribution of investment.	Rodrik (2007)	Innovation as the driving force of restructuring and productivity growth.	Cohen and Levinthal (1990)	Importance of firms' abilities to exploit new and external knowledge for innovation.
Lewis (1954)	Dual economy model with unlimited supply of labor – importance of sectorial differences – labor shifts from the traditional sector to the modern one.	Foellmi and Zweimuller (2008)	The main driver of structural change is the hierarchic nature of wants.		
Rostow (1959)	'Stage approach': structural discontinuities in the process of development that impose the need of pre-requisites for countries to develop.				
Chenery and Taylor (1968)	Different growth patterns reveal distinct interactions of scale and resource endowments in countries in different stages of development. Technical progress as a result of innovation.	Lin (2011)	Importance of the development of both "hard" and "soft" infrastructures.	King and Levine (1993)	Importance of firms' abilities to exploit new and external knowledge for innovation.
Kuznets (1973)	Association between high growth rates or per capita income and productivity with a high rate of shifts in production structure as a result of changes in demand, in comparative advantage and in technology, with the latter being the determinant factor of growth.				
Abramovitz (1986)	Productivity growth rates vary inversely with productivity levels, meaning that countries facing technological backwardness are able to generate growth more rapidly than more advanced countries. Great importance of international knowledge spillovers in the promotion of growth and 'catch-up' process. 'Social capabilities' such as education and appropriate qualified organizations are essential to exploit new technology.	McMillan and Rodrik (2011)	Change from low-productivity sectors towards high-productivity ones. Importance of comparative advantages, currencies' valuation and labor markets' flexibility.	Aghion and Howitt (2005)	Imitation as a driver towards innovation.
Chenery and Syrquin (1989)	Changes in structure that accompany economic growth are a transition from a low income agrarian economy to an industrial urban economy with substantially higher income. Technological change influences the patterns of structural change, especially at the micro level.				

Source: Own elaboration.

Following Lewis (1954) and Kuznets (1973) regarding the assumption that labor flows from low-productivity to high-productivity sectors is a key vehicle for development, McMillan and Rodrik (2011) identify three factors that are useful for determining whether structural change goes in the right direction (*i.e*. labor flows from the low-productivity sector to the high-productivity activities), contributing to overall productivity growth. First, economies with comparative advantages in primary products are at a disadvantage, given that their ability to improve their productivity is much more limited. Second, countries with undervalued currencies are more likely to experience more growth-enhancing structural changes as this works like a subsidy on their industries. Finally, a higher flexibility of labor markets is associated with structural change inducing economic growth, due to the fact that it is easier for workers to flow across firms and sectors. Furthermore, labor productivity under this perspective can be achieved within economic sectors through capital accumulation and technological change, or by moving labor across sectors, from low-productivity activities to high-productivity ones, thus, increasing the overall labor productivity of the economy.

Abramovitz (1986) shares the same view as the previous authors regarding the improved productivity as a result of labor transfer from low-productivity to high-productivity sectors. In the author's perspective, productivity growth rates vary inversely with productivity levels, meaning that countries facing technological backwardness are able to generate growth more rapidly than more advanced countries. Moreover, countries are technologically backward because of some certain social characteristics, commonly known as social capabilities. Therefore, it is the combination of the technological gap and the social capability of countries that defines their potential for productivity improvements towards catching-up. Fagerberg and Srholec (2008), rather than considering only countries' social capabilities, assume that countries that do not succeed in developing appropriate technological capabilities are expected to lag behind due to four different types of capabilities: the development degree of the innovation system, the quality of governance, the nature of the political system and the degree of openness of the economy. Authors' results show that a developed innovation system and good governance are both, indeed, critical for countries to catch-up.

According to Lin (2011), at different levels of development, countries tend to have different economic structures due to differences in their endowments and such structures require different tangible and intangible infrastructures to facilitate their operations and transactions. In the earlier stages of development, countries do not need

well developed infrastructures, neither "hard" (*e.g.*, highways and airports) nor "soft" (*e.g.*, institutions and regulations), because market transactions and the production process are very simple and elementary. Contrarily, developed countries tend to have comparative advantages in capital intensive industries with economies of scale in the production process. In this case, both "hard" and "soft" infrastructures gain importance in order to ensure that the needs of national and global markets are satisfied.

King and Levine (1993) consider the relevance of financial institutions in promoting innovation and, consequently, productivity improvements and economic growth. In their model, financial systems affect entrepreneurial activities that lead to productivity improvements in four different ways: by evaluating prospecting entrepreneurs and choosing the most promising projects; by mobilizing resources to finance promising projects; by allowing investors to diversify the risk associated with uncertain innovative activities; and, by revealing the potential rewards to engaging in innovation, relative to continuing to make existing products with existing techniques.

Contrarily to the previously presented arguments, Foellmi and Zweimuller (2008) introduce a demand-side perspective by considering that each product experiences the Engel's consumption cycle, starting off as a luxury with high income elasticity and ending up as a need with low income elasticity. There is, then, an increased demand for new goods, while old goods face a decreased demand, which induces changes in labor resources from old to new industries. In this view, the main driver of structural change is the hierarchic nature of wants, given that in the process of economic growth consumers get saturated of the existing products and, thus, industries need to introduce new products in order to sustain growth. Moreover, innovation becomes of extreme importance for economic growth as new goods have to be continuously introduced to ensure that demand keeps pace with technological progress, and, this reflects a two-way causality between growth and structural change.

Hence, economic growth is, undoubtedly, strongly associated with technological progress (Chenery and Taylor, 1968), which may be perceived as a result of innovations. This idea is also highlighted by Lin (2011), who considers that economic development requires continuous introduction of new and better technologies to an already existing industry, but also demands continuous diversification and upgrading to new industries more capital-intensive. Similarly, Rodrik (2007) argues that innovation is the driving factor enabling restructuring and productivity growth.

According to Aghion and Howitt (2005), innovations may be produced internally by R&D activities, or, they may be imitated from abroad. Although imitation at high levels may have negative impacts on economic growth, little imitation is growth-enhancing, given that a firm that is imitated faces larger incentives to innovate as it will be equally competing with the other companies until it innovates again (Aghion *et al*., 2001). However, foreign technologies cannot simply be copied from other country without any cost, as technology transfers require the receiving country to invest resources in order to be able to adapt them locally, by investing in its absorptive capabilities. Aghion *et al*. (2001)'s emphasis on the education system was earlier identified by Lucas (1988), who considers the accumulation of human capital as the main driver of economic growth.

Cohen and Levinthal (1990) also enhance the importance of firms' abilities to exploit new and external knowledge for innovative purposes, adding the crucial role of prior related knowledge in such process. Firms must, thus, invest in their absorptive capabilities so that they are able to recognize and assimilate external information, taking into consideration that learning is cumulative and that learning performance is best when the subject is related to something learnt previously.

Abramovitz (1986) considers that, besides depending on countries' educational levels and firms' organizations, social capabilities also depend on countries' openness to competition, on the establishment and operation of new firms, and on the trade of new goods and services. Accordingly, the combination of technological gap and social capabilities determine a country's capacity to improve its productivity and, consequently, to catch-up. In order to observe those improvements, a country should then promote appropriate ways for the diffusion of knowledge (*e.g*., multinational corporations and channels of technological international communication), conditions that facilitate structural changes and macroeconomic conditions that encourage capital investment.

2.3. National competitiveness

Competitiveness may be defined at both the firm and country levels. At the firm, or micro level, competitiveness has a relatively clear meaning and refers to the capacity of firms to compete, grow and be profitable in the marketplace (Bristow, 2005), so that according to Porter (1990), firms' competitiveness is simply a proxy of productivity. However, defining countries' competitiveness is much more complicated than defining

firms' competitiveness, because countries cannot simply just go out of business like companies (Krugman, 1994). Although, as a response to globalization, countries do compete with each other for attracting investment, for instance (Anastassopoulos, 2007) and many governments now follow a strategy of national competitiveness for fostering economic development (Lall, 2001; Ketels, 2006; Berger, 2008), even though they often disagree about the ways to achieve it (Delgado *et al*., 2012).

Undeniably, the discussion about the definition of competitiveness, *i.e*. countries' ability to compete on international markets (Narula and Wakelin, 1998), has been fierce over the years (Fagerberg *et al*., 2007), and people do use competitiveness in a variety of ways, namely to refer to the ability to achieve certain general outcomes (*e.g*. high standards of living and economic growth) and to the ability to achieve specific outcomes (*e.g*. job creation, exports, or FDI) (Delgado *et al*., 2012). According to the Global Competitiveness Report 2016-2017 (Schwab and Sala-i-Martin, 2016), competitiveness can be defined as *"(...) the set of institutions, policies and factors that determine the level of productivity of a country"* (Schwab and Sala-i-Martin, 2016, P. 35).

The level of productivity sets, in turn, the level of prosperity that a country can achieve, thus, a more competitive economy is one that is likely to grow faster over time (Schwab and Sala-i-Martin, 2016). This definition follows Porter (1990)'s definition of competitiveness of a region as the productivity that firms located there can achieve. Similarly, Delgado *et al*. (2012) define "foundational competitiveness" as the expected level of output per working-age individual, going beyond the expected level of productivity per employed worker, thus, capturing both influences on prosperity.

Although competitiveness is commonly used as synonym of productivity, the two concepts are, in fact, different: productivity corresponds to the internal capability of an organization or country, and competitiveness refers to the relative position of an organization or country in comparison to its competitors (Onsel *et al*., 2008). Furthermore, the causality between productivity and regional prosperity is not clear, as income growth may induce productivity improvements as well as the other way around (Bristow, 2005). Though, it is unquestionable that productivity remains a key driver of prosperity, given that prosperity can increase only if inputs of production are used more efficiently and in smarter ways in order to satisfy constantly evolving human demands (Schwab and Sala-i-Martin, 2016).

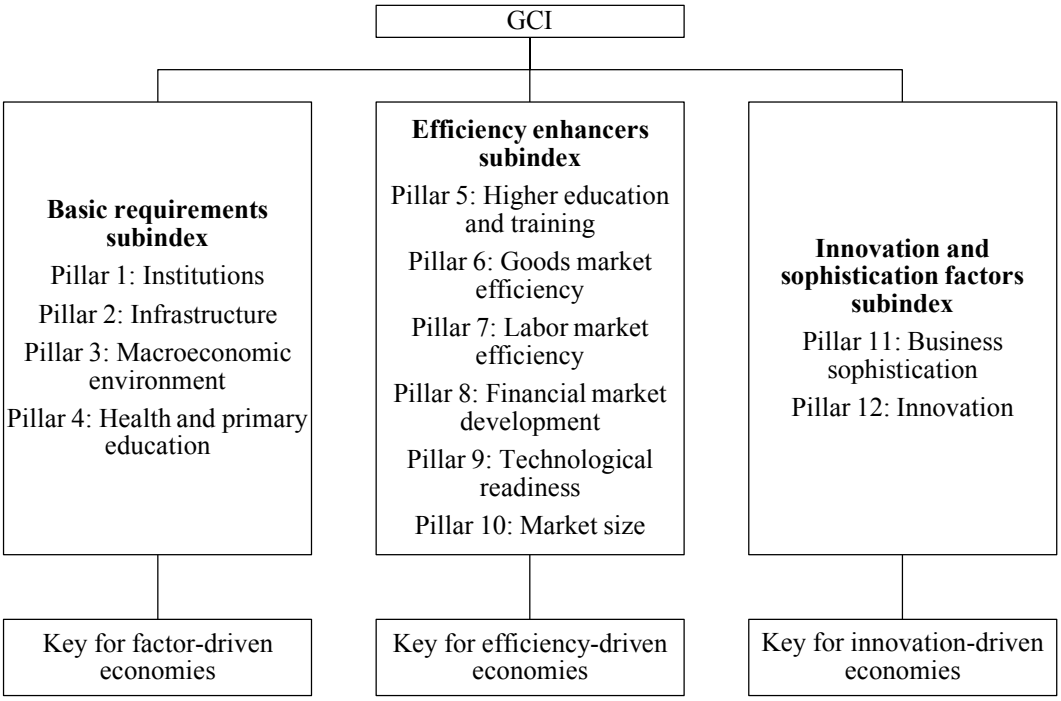
According to Trabold (1995), competitiveness can also be defined as countries' ability to sell, earn, adjust and attract investments, which is very similar to Porter (1990)'s view of countries like companies. Therefore, countries do compete in the attraction of FDI projects, and, when deciding where to invest, investors look for the location which offers them the highest possible returns (Berger, 2008). Hunya (2000) concludes for a positive link between foreign investment, or FDI, and various components of international competitiveness at both the aggregate (*i.e.*, macro) and the sectorial (*i.e.*, micro) levels. In addition, the author finds that the foreign presence is associated with a faster pace of structural change, for both the output structure and the country's exports. Indeed, being an open economy and an attractive location for investment will create incentives to innovate and invest in new technologies, because firms are exposed to competition and new ideas and they can benefit from the technology transfer from imports and FDI, thus, generating prosperity indirectly and in the long run (Delgado *et al*., 2012; Schwab and Sala-i-Martin, 2016).

Due to some pressures induced by globalization and the emergence of competitiveness as an important policy goal, it is important to have a framework and indicators by which policymakers and practitioners are able measure, analyze and compare country's competitive position in international markets and to find out who is "winning" (Onsel *et al*., 2008; Bristow, 2005). Every year, some organizations, such as the World Economic Forum (WEF) and the Institute of Management and Development (IMD), publish rankings of countries according with national competitiveness. These rankings serve as benchmarks for national policymakers and other interested parties to judge the relative success of their countries in achieving competitiveness as represented by well-known and accepted indexes (Onsel *et al*., 2008).

Both rankings produced by the IMD and the WEF, take into consideration a range of micro- and macroeconomic determinants that are all interlinked, reflecting the complexity of the development process (Schwab and Sala-i-Martin, 2015). According to Onsel *et al*. (2008), the efficiency of a country's institutions, educational and health systems, communication infrastructures and economic stability determine its firms' capabilities to survive and to be competitive in international markets. Therefore, both micro- and macroeconomic characteristics jointly determine an economy's level of productivity and competitiveness (Porter, 1990; Onsel *et al*., 2008; Delgado *et al*., 2012). Porter (1990) actually considers that without microeconomic improvements, macroeconomic reforms fail to achieve sustainable improvements in prosperity.

This study focus on the index produced by the WEF – the Global Competitiveness Index (GCI) –, which combines 114 indicators, each of them capturing a different concept that influences productivity and long-term prosperity (Schwab and Sala-i-Martin, 2016). The indicators are grouped into 12 pillars (Figure 2), namely institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation and sophistication (*Ibid*). In turn, these pillars are divided into three sub-indexes - basic requirements, efficiency enhancers, and innovation and sophistication factors -, which are given a different weight in the calculation of the overall index, according with each economy's stage of development. The stage of development of each country is assessed by its GDP per capita and the share of exports that correspond to raw materials (*Ibid*).

Figure 2. The GCI framework



Source: Schwab and Sala-i-Martin (2016).

Therefore, the WEF accounts for development issues, by considering that each competitiveness factor (*e.g.* labor market efficiency) will matter differently for economies in different stages of development, similarly to Porter (1990)'s perspective. Thus, in the first stage the economy is factor-driven, so that what matters are the well-functioning of institutions, well-developed infrastructures, a stable macroeconomic

environment and a healthy workforce with at least basic education, as countries compete based on their factor endowments (*i.e*. primary unskilled labor and natural resources). Differently, in the second stage, the efficiency-driven one, competitiveness is increasingly driven by higher education and training, efficient goods markets, efficient labor markets, developed financial markets, the ability to enjoy the benefits of existing technologies and a large domestic and foreign market. Finally, as countries move to the innovation-driven stage, wages and living standards rise so that business can only compete by using the most sophisticated product processes and by innovating new ones (Schwab and Sala-i-Martin, 2016).

The next chapter analysis some empirical studies that aim to investigate the determinants of competitiveness and others that assess the effect that FDI has mainly on economic growth, in order to evaluate how the link between FDI, structural change variables and competitiveness is being studied in the literature.

Chapter 3. FDI, structural change and competitiveness: Empirical studies

Many empirical studies had been undertaken in order to estimate effects of several variables on countries' competitiveness (Table 3) and many others have included FDI has an independent variable, mainly to determine the impact of that type of investment on economic growth (Table 4).

As could be seen in both Table 3 and Table 4, there is a great diversity regarding the variables used to measure competitiveness in the empirical studies analyzed. There are some studies that focus on the export performance of countries by using variables such as export and FDI shares of each country in the global market (*e.g.* Narula and Wakelin, 1998) or high-technology exports as a percentage of the total manufacturing exports (*e.g.* Álvarez and Marin, 2013). On the other hand, other studies consider that competitiveness is a proxy of productivity and use variables like the total factor productivity (*e.g.* Woo, 2009; Krammer, 2015) or the output per potential worker (*e.g.* Delgado *et al*., 2012).

Likewise, there is also a great diversity in what concerns the variables used to measure FDI. While some studies consider the stocks of FDI, both inward and outward (*e.g.* Álvarez and Marin, 2013; Pegkas, 2015), the majority uses indicators of FDI flows (*e.g.* Borensztein *et al*., 1998; Li and Liu, 2005; Woo, 2009; Iamsiraroj and Ulubasoglu, 2015; Iamsiraroj, 2016; Simionescu, 2016). Within the indicators of FDI flows, there is also some disagreement, as some authors consider FDI inflows as percentage of GDP (*e.g.* Li and Liu, 2005; Woo, 2009; Iamsiraroj, 2016), others use FDI inflows from OECD countries as a percentage of GDP (*e.g.* Borensztein *et al*., 1998) and there are also some authors that consider FDI net inflows as a percentage of GDP (*e.g.* Simionescu, 2016).

The majority of the studies that assess the effect of FDI on either competitiveness or economic growth, conclude for a positive impact of such variable (*e.g*. Borensztein *et al*., 1998; Li and Liu, 2005; Pegkas, 2015; Iamsiraroj, 2016). However, others find the effect of FDI on competitiveness as being not significant (*e.g.* Bakardzhieva *et al*., 2010) or significant but with a low impact (*e.g.* Pelinescu and Radulescu, 2009) and Simionescu (2016) concludes for a negative effect of such type of inflows on economic growth for some countries.

In general, these studies also include variables that assess countries' structural change, even though not mentioning it explicitly. When studying countries' competitiveness, many authors include as explanatory variables indicators that measure countries' technology and human capital (*i.e.* capacity). To measure technology and innovation, authors use mainly R&D expenditure as a percentage of GDP (*e.g.* Álvarez and Marin, 2013; Krammer, 2015) and the number of patent applications granted (*e.g.* Narula and Wakelin, 1998; Fagerberg *et al*., 2007; Zhang, 2014). On the other hand, human capital is measured as the percentage of tertiary enrolments in technical subjects in total population (*e.g.* Zhang, 2014) or as the average years of schooling in the population with more than 15 years (*e.g.* Woo, 2009).

The studies that focus on the impact of FDI on economic growth, however, tend not to include many technological variables, but many include indicators of human capital, by using the average number of years spent in education (*e.g.* Stancheva-Gigov, 2016) or secondary-schooling indicators, like secondary attainment and initial-year level of average male secondary schooling (*e.g.* Borensztein *et al*., 1998; Li and Liu, 2005; Iamsiraroj and Ulubasoglu, 2015; Iamsiraroj, 2016; Stancheva-Gigov, 2016).

Technological variables have a positive effect on countries' competitiveness in all of the considered studies (*e.g.* Fagerberg *et al*., 2007; Álvarez and Marin, 2013) and human capital also has a positive impact on both countries' competitiveness (*e.g.* Fagerberg *et al*., 2007; Woo, 2009; Zhang, 2014) and economic growth (*e.g.* Li and Liu, 2005; Stancheva-Gigov, 2016), with the exception of the study produced by Iamsiraroj and Ulubasoglu (2015), which concludes for a negative impact.

Table 3. Empirical studies on the determinants on competitiveness

Author(s)	Main goal/RQ	Sample	Methodology	Dependent variable	Explanatory variables		Conclusions
Narula and Wakelin (1998)	To assess the importance of country-level determinants in affecting the international competitiveness of a country, defined as both exports and FDI.	40 countries across four years: 1975, 1979, 1984 and 1988.	Ordinary Least Squares (OLS)	Export – each country's exports relative to exports of the entire sample of 40 countries, normalized by the ratio of that country's population to the population of the whole sample. FDI - Stock of outward investment relative to the stock for the whole sample normalized by relative populations and the stock of inward investment relative to the stock for the sample over relative populations.	Technological capabilities	Ratio of patents granted in the country to the total number of students at the tertiary level	Technological capabilities, and the level of development of the country are two of the key determinants of competitiveness.
					Level of development	GNP per capita	
						Gross fixed capital	
						Aggregate demand per capita	
					Availability of resources	% of each country's exports made up of primary commodities	
					Relative market size	Private consumption divided by the one of Germany	
					Trade intensity	Sum of exports and imports over population	
Fagerberg *et al.* (2007)	To analyze empirically why some countries consistently outperform others, by placing an emphasis on the role played by four different aspects of competitiveness: technology,	90 countries in the period 1980-2002	OLS	GDP growth rate (in PPPs constant international USD)	Log of the initial GDP per capita		Relevance of technology, capacity and demand competitiveness for economic growth. The main factors that prevent developing countries from catching-up in technology and income are deteriorating technology, capacity competitiveness and their export structure.
					Technological competitiveness: 1) S&T outputs 2) ICT 3) Infrastructure	UPSTO patent grants (investor's resident country); articles in scientific and engineering journals	
						Telephone mainlines	
					Capacity competitiveness: 1) Education 2) Financial system	Secondary school enrollment, tertiary school enrollment, average schooling years in population	

	capacity, demand and price/cost.				3) Governance	Contract intensive money (ratio of non-currency money to total money supply), domestic credit to private sector, monetary stability (standard deviation of GDP deflator in logs)	
						Political rights and civil liberties; Women's economic, political and social rights	
					Price competitiveness	Unit labor costs (ratio of average wage to labor productivity in manufacturing)	
					Demand competitiveness	Exports – three-digit level of SITC, rev.2	
					Control variables	Longitude of country centroid	
						High-low elevation	
						Access to ocean or navigable sea	
						Desert tropical ecozone	
						Very or moderately suitable soil for agriculture	
Pelinescu and Radulescu	To determine the FDI effects on economic growth	Macro quarterly data in the	OLS	Growth rates of quarterly GDP and of quarterly exports	FDI		GDP growth depends directly on the evolution of the external demand,

(2009)	and on exports in Romania.	period 2000Q1-2009Q1			Quarterly internal audit		on labor productivity and on the current evolution of the real domestic credit. FDI also influences economic growth, but its direct influence is not significant. However, the tight relation with productivity could suggest indirect effects of FDI on the GDP growth through the increase in the labor productivity of the Romanian economic sectors. Labor productivity with one lag and the real GDP growth induce the rise in exports.
					Quarterly real labor productivity		
					External demand		
					Increase in the interest rate on monetary market for 3 months		
Woo (2009)	To investigate the effect of FDI on TFP growth in a large number of countries in 1970-2000.	Developing and developed countries between 1970 and 2000	OLS	Total Factor Productivity (TFP) growth rate	FDI	FDI inflows (% of GDP)	FDI has a positive and direct effect on TFP growth, and there is no evidence that the impact of FDI on TFP growth is conditional on the recipient country's capability to absorb foreign technology.
						Gross FDI flow (sum of inward and outward FDI capital flows as a % of GDP)	
						FDI inflows from OECD countries as a % of GDP	
					Human capital	Average years of schooling in the population more than 15 years old	
					Population		
					Government share	Initial government consumption	

Bakardzhieva *et al*. (2010)	To identify which capital flows lead to at least significant appreciation of the real effective exchange rate (REER), or have no impact on the REER at all, and thus do not necessarily undermine competitiveness. Thus, to investigate the impact of each type of capital flow on REER behavior in developing countries.	57 developing countries in the 1980-2007 period	Generalized method of moments (GMM)	Real effective exchange rate (REER)	Aggregated capital flows (proxy NKF)	Sum of 6 variables (income, remittances, aid, FDI, portfolio investments, and other investments)	An increase in NKF leads to the appreciation of REER and to a possible loss of competitiveness. An increase in terms of trade and productivity also leads to the appreciation of the REER, while an increase of openness and gov. consumption tends to depreciate REER. Portfolio investments, foreign borrowing, aid, and income lead to real exchange rate appreciation, while remittances have disparate effects across regions. FDI has no effect on the real exchange rate, thus not having detrimental effects on competitiveness. All capital flows except FDI have a significant positive impact on the REER.
					Portfolio investments	Net portfolio investments as a % of GDP	
					Debt	Net borrowing from abroad (% of GDP)	
					Income	% of GDP	
					Aid	Public official current transfers (% of GDP)	
					Remittances	Private unilateral transfers to GDP ratio	
					FDI	FDI as a % of GDP	
					Terms of trade	Relative price of exports relative to imports	
					Openness degree	Ratio of the sum of exports and imports to GDP	
					Government consumption	Public consumption expenditure as a % of GDP	
					Productivity	Real GDP per capita	
Delgado *et al*. (2012)	To determine the effects of three broad and interrelated drivers of competitiveness: social infrastructure and political institutions (SIPI), monetary and fiscal	130 countries over the period 2008-2011	OLS	(Competitiveness) Output per potential worker: • (log of) GDP adjusted for PPP per working age individual (15-64 years old) • GDP (PPP) per capita	Aggregation of individual indicators into composite measures covering MICRO, SIPI and MFP.		Positive and separate influence of each driver on output per potential worker.

	policy (MFP) and the microeconomic environment (MICRO), on national competitiveness.						
Álvarez and Marin (2013)	To study how the integration of firms from developing countries in sophisticated high-tech markets can be defined by the combined action of MNE and the ability for technology absorption and creation.	41 developing countries and 34 developed countries in the period between 1996 and 2010	GMM	High technology exports (as the % of the total manufacturing exports)	FDI inward	FDI inward stock (as the % of the GDP)	Inward FDI has a positive effect in the high-tech competitiveness of developed countries and a negative impact on the one of developing ones. Outward flows of FDI have a positive impact on both developing and developed countries' high-tech competitiveness. The same holds true for R&D, patents, and the payments and receipts of royalty and license fees.
					FDI outward	FDI outward stock (as the % of the GDP)	
					Import high-tech	High technology imports from high-income countries (as the % of total imports)	
					R&D	R&D expenditure (as the % of GDP)	
					Patents	Number of total patents (per 1000 habitants)	
					Roypayment	Royalty and license fees, payments (current US$ by thousands of inhabitants)	
					Royreceipt	Royalty and license fees, receipts (current US$ by thousands of inhabitants)	
Krammer (2015)	To test if institutional quality has a positive impact on domestic productivity.	47 countries (20 developed Western and 27 transition countries) over the	Theoretical model + econometric estimations	Total factor productivity	Trade spillovers		Good institutions have positive direct effects on productivity. Institutional quality moderates the effects of foreign technological spillovers on productivity.
					FDI spillovers		
					Domestic R&D		
					Average governance score		
					Average freedom score		
					IPR index		
					Ease of doing business		

		period 1990 to 2009					
Zhang (2014)	To determine how FDI affects industrial competitiveness in China.	21 manufacturing sectors for 31 regions in six years (2005-2010)	OLS	Industrial competitiveness (index composed of four indicators: manufacturing value added (MV) per capita, manufactured exports (ME) per capita, shares of medium- and high-tech products (MHTP) in MV and shares of MHTP exports in ME)	FDI	Share of industrial output by foreign-invested enterprises in total industrial output per capita	FDI has large positive effects on China's industrial performance and its contribution is enhanced by its interaction with local human capital.
					Human capital	Share of tertiary enrollments in technical subjects in total population	
					R&D	Number of patent applications granted	
					Infrastructure	Index constructed by three indicators: length of railways in operation per one hundred square kilometers, length of highways per one hundred square kilometers, and capacity of mobile telephone exchanges per one thousand people	
					Control variables	Regional dummies, year dummies, etc.	

Source: Own elaboration.

Table 4. Empirical studies on the determinants of economic growth that consider FDI

Author(s)	Main goal/RQ	Sample	Methodology	Dependent variable	Explanatory variables		Conclusions
Borensztein *et al*. (1998)	To test the effect of FDI on economic growth in a cross-country regression framework, using data on FDI flows from industrial countries to 69 developing ones.	69 developing countries for the period 1970-1989	SUR (Seemingly unrelated regressions) technique	Growth rate – average annual rate of per capita real GDP over each decade	Log initial GDP		FDI is an important vehicle for the transference of technology. However, the higher productivity of FDI holds only when the host country has a minimum threshold stock of human capital.
					Schooling	Initial-year level of average male secondary schooling	
					Government consumption	Average share of real government consumption in real GDP	
					FDI	Gross FDI originated in OECD member countries into developing economies	
					FDI * Schooling		
					Sub-Saharan African dummy		
					Latin American dummy		
					Assassinations		
					Wars		
					Political rights		
					Financial depth		
					Inflation rate		
					Institutions		
					Government share	Initial government consumption	
Li and Liu (2005)	To investigate whether FDI	84 countries	OLS	Real GDP per capita growth	Population	Population growth	There is a strong connection between FDI and economic

	affects economic growth or not.	(21 developed and 63 developing) for the period between 1970 and 1999			Human capital	Level of secondary school attainment	growth in both developed and developing countries.
					Investment	Ratio of gross domestic investment to GDP	
					FDI	Ratio of FDI inflow to GDP	
Iamsiraroj and Ulubasoglu (2015)	To explore the global FDI-growth relationship.	140 countries in the period 1970-2009	OLS	Growth in real GDP per capita	FDI (% of GDP) Financial development FDI * financial development Trade openness FDI * trade openness Government size Inflation Secondary schooling Lagged FDI Lagged FDI * financial development Lagged FDI * trade openness		FDI positively affects economic growth and this situation holds as strongly as in the developing world.
Pegkas (2015)	To analyze the relationship between FDI and economic growth, and to estimate the effect of FDI on economic growth in the Eurozone countries.	Eurozone countries in the period 2002-2012	Fixed Effects Methodology (FEM) and Random Effects Methodology (REM)	GDP as a % of GDP	Stock of FDI as a % of GDP		There is a positive long-run co-integrating relationship between FDI stock and economic growth. The results also indicate that the stock of FDI is a significant factor that positively affects economic growth in the Eurozone countries.

Iamsiraroj (2016)	To investigate FDI-growth associations.	124 countries for the period 1971-2010	3SLS (Three stage least squares)	Growth of GDP per capita	FDI inflows/GDP	Overall effects of FDI are positively associated with growth and vice versa; whereas labor force, trade openness and economic freedom are other key determinants of FDI, which in turn stimulate growth further.
					Log (initial GDP per capita)	
					Labor growth	
					Primary attainment	
					Secondary attainment	
					Tertiary attainment	
					FDI/GDP * primary	
					FDI/GDP * secondary	
					FDI/GDP * tertiary	
					Domestic investment/GDP	
					Trade/GDP	
					Government expenditure/GDP	
					Credit in private sector	
					Economic freedom	
Simionescu (2016)	To investigate the relationship between economic growth and FDI inflows in the EU-28.	EU-28 in the period 2008-2014	Bayesian regression estimations	Real GDP rate	FDI (Net inflows (% of GDP)	FDI has a positive effect in economic growth and economic growth has a positive effect on FDI in Belgium, Czech Republic, Germany, Greece, Spain, France, Croatia, Italy, Latvia, Lithuania, Luxembourg, Hungary, Poland, Romania, Slovenia, Slovakia and Finland. In Austria, Denmark, Estonia and Cyprus, Portugal, Sweden and the UK, FDI affects negatively economic growth and GDP rate has a negative impact on FDI. Finally, for Malta and the Netherlands, FDI negatively influences economic growth and

							GDP rate has a positive impact on FDI.
Stancheva-Gigov (2016)	To estimate and show the impact of FDI on economic growth.	84 countries for the period 1972-2011	REM	Average rate of real GDP per capita	Initial GDP per capita		Foreign direct investment rate is one of the key determinants of economic growth, as well as the human capital, the trade openness and government consumption.
					Education levels of the population of over 25 years of age	Average number of years spent in education	
					Natural population growth	Annual growth rate of the population	
					FDI inflows	FDI as a % of GDP	
					Trade openness	Export + Import as a % of GDP	
					Government consumption	Government consumption as a % of GDP	
					Bureaucracy quality		
					Corruption		
					Real effective exchange rate		
					Constitution		

Source: Own elaboration.

Chapter 4. The internship and the host institution

The internship at aicep Portugal Global – Trade & Investment Agency was between 3rd October 2016 and 26th February 2017 and the work was developed in the Corporate & Investment Department (DCI). The main task developed during the internship was an analysis of the determinants of competitiveness of Portugal in the attraction of FDI projects, which was the basis for the present work.

The host institution, aicep Portugal Global – Trade & Investment Agency, is a government business entity whose main goal is to attract investment to Portugal and to give support to Portuguese companies in their internationalization and export activities. Hence, the agency aims at promoting a competitive business environment that can enable the growth of the Portuguese economy. The agency is divided in three different departments, namely the Corporate & Investment Department (DCI), the Small and Medium Enterprises (SMEs) Department and the External and Institutional Relations Department (aicep, 2017[1]).

The internship at aicep Portugal Global was developed in the Corporate & Investment Department (DCI), whose activities are mainly focused on investment projects, namely on the attraction and support of them. Therefore, the department's activities correspond essentially to support services, counselling and coordinated contacts with Portuguese entities in order to facilitate investment processes. In this department there are also developed activities that aim to attract large companies to invest in Portugal. Indeed, its clients are large companies with an annual turnover of 75 million euro or investment projects over 25 million euro to whom it is given a Key Account Manager (KAM) that is in charge of helping the client in all the phases of the investment process (*Ibid*[1]).

The main goal of the internship was the elaboration of a dynamic analysis of Portugal's competitiveness factors in the attraction of FDI projects by comparing it with other economies in many subjects, namely the macroeconomic, institutional and social environment, the labor market, infrastructures, human capital, the business environment and the quality of life. The main idea was, then, to gather information that could be disclosed to potential investors in order to promote Portugal's characteristics that enhance the country's status of an attractive destination for FDI inflows.

[1] aicep Portugal Global website: http://www.portugalglobal.pt (accessed on 3rd March 2017).

The work produced during the internship encompassed an extensive analysis of indicators and ranking positions of Portugal and other countries with which it was compared for all the topics previously mentioned. The data was extracted from many sources, such as the World Economic Forum, World Bank, INE, Central Bank of Portugal, Eurostat and OECD. Even though the focus of the work was to enhance Portugal's characteristics that positively positions it in the international context, some aspects that it still needs to improve were assessed as well.

As previously stated, the ultimate goal of this internship report is to assess the role of FDI and structural change's dimensions on host countries' competitiveness. In order to do so, part of the information gathered in the internship from the sources mentioned above, is used to estimate a balanced panel data model for the 28 EU countries over the period 2002-2014, which is further developed in the next chapter that presents the empirical assessment of the research question proposed.

Chapter 5. The impact of FDI and structural change on countries' competitiveness: an assessment for EU countries

5.1. Methodology

The main goal of this study is to determine the impact of FDI inflows and structural change on host countries' competitiveness. In order to achieve this goal, we undertake an empirical assessment of the main determinants of competiveness for the EU countries, including FDI inflows and different dimensions of structural change as explanatory variables, besides some control variables, such as location and time dummy variables. The sample comprises information for the 28 EU countries between 2002 and 2014.

Our econometric model can be described as follows:

$$COMPETITIVENESS_{it} = \alpha_i + \beta X_{it} + u_{it} \quad (5.1)$$

where i represents the i^{th} cross-section unit (EU countries) (i=1,...,28), and t represents time (t=1,...,13). $COMPETITIVENESS_{it}$ is the dependent variable, assessed by the productivity of a country (GDP per person employed for country i at time t) or by the Global Competitiveness Index (GCI) produced by the World Economic Forum (WEF). β_0 is the common intercept and β is the vector of coefficients associated with the explanatory variables. X_{it} is the vector of explanatory variables for country i at time t. u_{it} is the random term for country i at time t.

Given that the data set combines time series and cross-section, an estimation of a balanced panel data will be pursued in order to study the effects of the above mentioned explanatory variables on competitiveness of countries. As stated above, the basic framework of our econometric model corresponds to a regression model in the form of the equation (5.1).

The individual effect is α_i that is expected to be constant over time t and to differ to the individual cross-sectional unit i. If we consider α_i to be the same across all units, we can assume that ordinary least squares (OLS) would provide estimates of α and β both consistent and effective (Greene, 2011). In order to generalize a model with these characteristics, we can use two different frameworks: a fixed effect model (FEM) and a random effect model (REM) (*Ibid*). FEM assumes that the independent variables are fixed across observation units and that the fixed effects are computed from the differences within each unit across time. Differently, REM includes information not

only across individual units but also across time periods, thus producing more efficient estimates. Even though, the estimates obtained by REM are consistent only if unit-specific effects are not correlated with the other explanatory variables (Greene, 2011).

5.2. Dependent variable

As previously mentioned, the discussion over the definition of competitiveness has been fierce over the years (Fagerberg *et al*., 2007). By considering Porter (1990)'s definition of competitiveness of a region as the productivity that firms located there can achieve, we define the dependent variable, competitiveness of country *i* in time *t*, as the country's productivity[2], or the GDP per person employed measured at 2011 constant prices (PPP$) (GDPPE), following Delgado *et al*. (2012) (Table 5). The GDP per person employed is calculated by dividing the GDP by the total employment of the economy and the data was gathered from the World Bank database.

Additionally, countries' competitiveness may also be measured by the Global Competitiveness Index (GCI) produced by the World Economic Forum. In the Global Competitiveness Report 2016-2017 (Schwab and Sala-i-Martin, 2016), competitiveness is defined as *"(...) the set of institutions, policies and factors that determine the level of productivity of a country"* (Schwab and Sala-i-Martin, 2016, P. 35). Thus, the GCI is calculated by taking into account several dimensions of countries' competitiveness, such as their macroeconomic stability, infrastructures, labor markets, etc. (see Figure 2, chapter 2.3).

Table 5. Dependent variable: main statistics

Variable	Description	Minimum	Maximum	Average	S.D.	Source
Competitiveness	GDP per person employed measured at 2011 constant prices (PPP$)	25064,15	226970,91	71350,50	32450,44	World Bank Database
	GCI	3,67	6,02	4,77	0,53	World Economic Forum

Source: Own elaboration.

[2] There are, however, other possible measures for competitiveness, as analyzed in the Table 3, such as the total factor productivity (TFP) (*e.g.* Woo, 2009; Krammer, 2014) and the real effective exchange rate (*e.g.* Bakardzhie *et al*., 2010). We did not consider these measures because data for the TFP was not available for the sample selected, and the real effective exchange rate is not a good measure of competitiveness taking into account our sample, as we consider only EU 28 countries.

5.3. Explanatory variables

The set of explanatory variables, X_{it}, encompasses FDI inflows and structural change variables, as well as control variables (Table 6). There are several studies that consider FDI as one of the explanatory variables of economic growth (Table 4, chapter 3). According to Borensztein *et al*. (1998), the variables used in these studies to measure FDI vary significantly between each other. The authors argue that FDI may be measured by the net FDI, which corresponds to inflows net of outflows, by gross FDI, but also by FDI inflows (*i.e*., the FDI into the country). The choice between the indicators will always depend on the FDI effect one is trying to capture.

Therefore, given that this study aims to study the effect of FDI inflows, the FDI variable that is used in the present study (FDI_{it}) corresponds to foreign direct inflows as a percentage of GDP. These inflows of investment are distinguished from the others because they imply an acquisition of management interest in a firm that operates in a different country from the one of origin of the investor. Such management interest has to correspond to 10 percent or more of voting stock.[3]

Following McMillan and Rodrik (2011), the variables that assess structural change in each economy are divided into three different dimensions, namely: i) the inter-sectorial transference of resources; ii) capital accumulation; and iii) technology and innovation. In order to assess the inter-sectorial transference of resources we consider the employment rates[4] in the different sectors of activity, namely in agriculture ($EAGR_{it}$), industry ($EIND_{it}$) and services ($ESERV_{it}$).[5] Regarding capital accumulation, both human and physical, we consider the percentage of labor force with tertiary education[6] ($TEDUC_{it}$) and the gross capital formation[7] (GCF_{it}). For the final dimension

[3] We have further considered the net inflows as a percentage of GDP (new investment inflows less disinvestment) from foreign investors divided by GDP. Results are similar to the ones obtained for FDI inflows as dependent variable, which are presented in Appendix 4.

[4] Correspond to the number of persons in working age that are involved in any activity to produce goods or provide services in each sector for pay or profit, whether at work during the reference period or not at work due to temporary absence from the job (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

[5] The agriculture sector includes activities in agriculture, hunting, forestry and fishing; the industry sector comprises activities of mining and quarrying, manufacturing, construction, and public utilities (electricity, gas and water); and, the services sector consists of activities in wholesale and retail trade, restaurants and hotels, transport, storage and communications, financing, insurance, real estate and business services, and community, social and personal services (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

[6] It is calculated by dividing the number of labor force who attained or completed tertiary education by the total number of labor force (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

[7] Formerly known as gross domestic investment (*e.g.* Li and Liu, 2005), consists of expenditures on additions to the fixed assets of the economy plus net changes in the level of inventories as a percentage of

of structural change - technology and innovation - we consider high-technology exports[8] as a percentage of manufactured products (HTE_{it}) and the total domestic expenditure on R&D[9] as a percentage of GDP ($RDEXP_{it}$).

Table 6. Explanatory variables: main statistics

Variable	Description	Minimum	Maximum	Average	S.D.	Source
FDI_{it}	FDI inflows as a % of GDP	-78,82	499,60	11,01	44,00	UNCTAD
	FDI net inflows as a % of GDP	-43,46	451,72	10,74	39,38	World Bank Database
$EAGR_{it}$	Employment in agriculture as a % of total employment	0,90	33,50	6,15	5,62	World Bank Database
$EIND_{it}$	Employment in industry as a % of total employment	10,80	40,80	27,04	6,21	World Bank Database
$ESERV_{it}$	Employment in services as a % of total employment	35,40	85,70	66,35	9,03	World Bank Database
HTE_{it}	High-technology exports as a % of manufactured products	1,79	60,01	14,19	10,24	World Bank Database
$RDEXP_{it}$	Total domestic intramural expenditure on R&D as a % of GDP	0,24	3,91	1,44	0,89	World Bank Database
$TEDUC_{it}$	% of the total labor force with tertiary education	9,90	47,80	26,37	8,15	World Bank Database
GCF_{it}	Outlays on additions to the fixed assets of the economy plus net changes in the level of inventories as a % of GDP	11,60	41,54	23,15	4,68	World Bank Database

Source: Own elaboration.

GDP. Fixed assets include: land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, etc. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and work in progress (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

[8] Correspond to products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments and electric machinery (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

[9] Are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge. R&D covers basic research, applied research and experimental development (World Bank database website: http://data.worldbank.org (accessed on 25th August 2017)).

For the control variables, we include some dummy variables to control for location and time periods. For the location, we include two dummy variables: $GIIPS_{it}$ and $EAST_{it}$. $GIIPS_{it}$ assumes the value 1 for the countries that are included in the GIIPS group (Greece, Ireland, Italy, Portugal and Spain), whereas for the remaining countries it assumes the value 0. Therefore, this variable tries to capture if the countries belonging to the GIIPS group, which were the most affected by the recent global financial and European sovereign debt crises, show differences in their competitiveness levels. Differently, $EAST_{it}$ assumes the value 1 for the European Eastern countries and the value 0 for the remaining ones. The countries that are included in the Eastern countries group are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia. For the time period we include $CRISIS_{it}$ that is a dummy variable that assumes the value 1 for the years between 2008 and 2012 that correspond to the period in which the crisis was the worst in almost every European country, and the value 0 for the other years (between 2002 and 2008 and between 2012 and 2014).

In order to analyze the correlation between all explanatory variables, we use the software Eviews (Table 7).

Table 7. Correlation matrix between explanatory variables

	FDI	EAGR	EIND	ESERV	TEDUC	GCF	RDEXP	HTE
FDI	1,000							
EAGR	-0,131	1,000						
EIND	-0,072	0,270	1,000					
ESERV	0,127	-0,783	-0,795	1,000				
TEDUC	-0,075	-0,403	-0,640	0,661	1,000			
GCF	-0,064	0,220	0,533	-0,480	-0,228	1,000		
RDEXP	-0,148	-0,479	-0,318	0,500	0,362	-0,191	1,000	
HTE	0,460	-0,387	-0,223	0,367	0,069	-0,181	0,085	1,000

Source: Own elaboration.

In Table 7 the situations for which the correlation is high are highlighted, and, in order to avoid potential multicollinearity, we propose distinct specifications for the estimation of the econometric model so that there are not explanatory variables that show high correlation between each other in the same specification. We have further

considered the variance inflation factor (VIF) in order to test potential multicollinearity for each equation estimated, whose results are represented in the Appendix 1.

5.4. Estimation results

In order to proceed with the estimations of the models, we can use the random-effects model (REM) or the fixed-effects model (FEM). The choice between these two methods relies on the Hausman test's results (Appendix 2). The results suggest that it is appropriate to use the REM when measuring competitiveness with the GDP per person employed, and that it is better to use the FEM when considering the GCI as the measure of competitiveness. We estimate five different models for each of the two dependent variables, GDP per person employed and the GCI.

The different specifications are determined in order to avoid multicollinearity issues, and to include variables that measure the different aspects whose effects we are trying to explore. Thus, Model I and Model II include variables that measure FDI and each of the structural change's dimensions, namely, the transference of resources, the capital accumulation, and technology and innovation. Model III, Model IV and Model V, besides also including FDI, each of them comprises variables for each of the structural change's dimensions, so that we can capture the effect of each dimension separately.

Table 8 presents the estimation results when using GDP per person employed as the dependent variable. The specifications that include FDI and all the dimensions of structural change (I and II) have an acceptable global fit (46.19% and 41.91%, respectively), while the others show a lower global fit, with the minimum being 13.55% (V).

The results suggest that both FDI inflows and a higher share of employment allocated to the agricultural sector have a negative and significant impact on the competitiveness of countries. In fact, the results obtained in the estimation of the first model show that an increase of FDI inflows as a percentage of GDP by one percentage point is associated with a decrease of the GDP per person employed, or labor productivity, of 14.43 dollars. They also show that an increase of one percentage point in the share of employment in the agricultural sector induces a decrease in the labor productivity of 1,522.57 dollars, which is a much bigger effect when compared to the one of FDI inflows. In addition, we can conclude that an increase of one percentage point in the R&D expenditure on total GDP is associated with an increase of 3,353.02

dollars in the GDP per person employed, thus, this variable reveals a strongly positive impact on countries' competitiveness. The estimated results for Model I also suggest that Eastern European countries have a labor productivity lower than the other European countries by 27,480.96 dollars, and that the crisis' period is associated with an improved competitiveness of countries by 618.62 dollars.

In the other four models, FDI inflows' impact on countries' competitiveness remains statistically significant and negative, varying very little from one model to another. In Model II, for example, we obtain statistically significant and positive coefficients for the employment share in the services' sector, global capital formation, R&D expenditure, high-technology exports and the Eastern countries and crisis' period dummy variables. In this case, an increase by one percentage points of FDI inflows induces a decrease of 17.21 dollars in competitiveness. In addition, an increase of the share of employment in services' activities is associated with an increase of 881.46 dollars in labor productivity; an increase of one percentage point on the global capital formation induces an increase of 298.27 dollars in the GDP per person employed; an increase of one percentage point in the R&D expenditure as a percentage of GDP is associated with an increase of 2,500.49 dollars in labor productivity; an increase of one percentage points in the high-technology exports has a positive impact of 77.36 dollars on the GDP per employee; Eastern European countries generally have a productivity lower by 26,000.56 dollars in comparison to the other countries considered; and, finally, in the crisis' period the labor productivity in the EU-28 increased by 1,011.19 dollars.

In the other specifications, namely the Model III, Model IV and Model V, which assess each structural change dimension separately, the results obtained are similar to the ones of the two first specifications, that consider all the three dimensions together. The only difference occurs in the Model IV, that assesses the second dimension of structural change – capital accumulation –, where we obtain a statistically significant and positive coefficient for the tertiary education, as an increase of one percentage point in the share of tertiary educated people on total labor force is associated with an increase 454.42 dollars in labor productivity.

Table 8. Estimation results for GDP per person employed as the dependent variable (Two-way REM)

Independent variables	Dependent variable: GDPPE				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	83473.85*** (9687.14)	11612.97 (10418.36)	45924.76*** (10172.70)	74492.11*** (9853.50)	81075.02*** (8314.57)
FDI	-14.43*** (4.94)	-17.21*** (5.15)	-19.40*** (4.80)	-17.79*** (5.60)	-19.75*** (4.95)
EAGR	-1522.57*** (165.26)				
EIND					
ESERV		881.46*** (84.03)	589.32*** (93.91)		
TEDUC	96.96 (60.11)			454.42*** (54.37)	
GCF	54.66 (52.06)	298.27*** (59.89)		57.05 (56.48)	
RDEXP	3353.02*** (866.83)	2500.49*** (917.23)			2928.09*** (889.86)
HTE	-38.54 (42.77)	77.36* (42.84)			98.95** (41.04)
GIIPS	-1206.45 (16796.85)	-2390.20 (14711.50)	-7084.72 (13835.59)	-8789.29 (17638.62)	-7431.93 (14888.88)
EAST	-27480.96** (13215.59)	-26000.56** (11595.82)	-33040.93*** (10943.09)	-39516.64*** (13835.55)	-38138.23*** (11706.08)
CRISIS	618.62* (349.41)	1011.19*** (357.56)	1694.63** (831.83)	1829.47*** (370.38)	2535.29*** (823.68)
R^2	0.4619	0.4191	0.1860	0.3009	0.1355
R^2 adjusted	0.4482	0.4060	0.1746	0.2891	0.1209
S.E. of regression	2957.45	3097.72	2862.37	3369.75	2950.47
Sum squared residual	0.00	0.00	0.00	0.00	0.00
F-statistic	33.77	32.02	16.36	25.61	9.32
Durbin-Watson statistic	0.79	0.72	0.66	0.70	0.71

Note: significance level at 1% (***), 5% (**) and 10% (*).

Hence, we can conclude that, when measuring countries' competitiveness by labor productivity, in particular by the GDP per person employed, FDI inflows and a higher share in the agricultural sector have a negative impact on countries'

competitiveness, while higher percentages of employment in the services sector, tertiary educated labor force, global capital formation, expenditure on R&D activities and high-technology exports are associated with an improved competitiveness. Furthermore, we can conclude that Eastern European countries tend to have a significantly lower competitiveness when compared to the other EU-28 countries and that in the crisis period competitiveness tended to increase in the region considered.

The estimation results obtained when considering the GCI as the dependent variable are represented in Table 9. The estimated coefficients are all statistically significant and all the specifications have a good global fit, with the lowest adjusted R-squared being 64.65% (Model III) and the highest 83.85% (Model I).

The results obtained are in accordance with the ones achieved for GDP per person employed as the dependent variable. FDI inflows show a negative, even though not strong, effect on countries' competitiveness. An increase of the FDI inflows by one percentage point is associated with a decrease of the GCI, even though very close to zero, in all the five specifications. Whereas an increase in the share of employment allocated to agricultural activities by one percentage points induces a decrease of the GCI by 0.01 units (Model I), an increase of 1 percentage point in the share of employment in the services' sector is associated with an increase of the GCI by 0.01 units (Model II and Model III). In both Model I and Model IV, an increase of the percentage of people with tertiary education in total labor force by one percentage point is associated with an increase of the GCI by 0.01 units.

An increase in the global capital formation by one percentage point induces an increase of the GCI between 0.01 (Model I and Model II) and 0.02 (Model IV) units. The percentage of R&D expenditure on total GDP appears to be the explanatory variable with the most significant impact on GCI, as an increase of one percentage point in this variable is associated with an increase of the index value by more than 0.30 units in the three specifications where it is included (0.31 in Model I, 0.32 in Model II and 0.34 in Model V). The percentage of high-technology exports is also associated with a positive impact in the GCI, although this impact is very close to zero in each specification where it is included.

Table 9. Estimation results for GCI as the dependent variable (FEM: period-fixed)

Independent variables	Dependent variable: GCI				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	3.98*** (0.10)	3.38*** (0.21)	4.49*** (0.26)	4.44*** (0.12)	4.44*** (0.06)
FDI	-0.00* (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
EAGR	-0.01*** (0.00)				
EIND					
ESERV		0.01*** (0.00)	0.01*** (0.00)		
TEDUC	0.01*** (0.00)			0.01*** (0.00)	
GCF	0.01*** (0.00)	0.01*** (0.00)		0.02*** (0.00)	
RDEXP	0.31*** (0.02)	0.32*** (0.02)			0.34*** (0.02)
HTE	0.00*** (0.00)	0.00*** (0.00)			0.00*** (0.00)
GIIPS	-0.25*** (0.04)	-0.26*** (0.04)	-0.62*** (0.05)	-0.64*** (0.05)	-0.30*** (0.04)
EAST	-0.34*** (0.05)	-0.30*** (0.06)	-0.69*** (0.07)	-0.86*** (0.05)	-0.40*** (0.04)
CRISIS					
R^2	0.8385	0.8233	0.6465	0.6840	0.8071
R^2 adjusted	0.8291	0.8135	0.6302	0.6684	0.7976
S.E. of regression	0.22	0.23	0.32	0.30	0.24
Sum squared residual	16.22	17.76	35.52	31.76	19.39
F-statistic	89.07	84.34	39.67	44.05	85.14
Durbin-Watson statistic	0.54	0.55	0.47	0.46	0.53

Note: significance level at 1% (***), 5% (**) and 10% (*).

Differently from the estimation with GDP per person employed as the dependent variable, we obtain statistically significant coefficients for the location dummy GIIPS, thus, we can conclude that this group of countries, composed by Greece, Italy, Ireland, Portugal and Spain, have a lower competitiveness in comparison with the other EU-28

countries. In Model I the results show that these countries have a GCI lower by 0.25 units in comparison to the other countries, in Model II this value is 0.26, in Model III 0.62, in Model IV 0.64, and, finally, in Model V it is 0.30.

The same happens for the Eastern European countries, something that has been previously found in the estimation results represented in Table 8. The results show that these countries tend to have a lower GCI by between 0.30 (Model II) and 0.86 (Model IV) units, when compared to the other EU-28 member countries.

We also conducted an estimation of the five different specifications using the FDI net inflows as a percentage of GDP instead of FDI inflows as percentage of GDP as explanatory variable (Appendix 4). Whereas the results remain similar to the ones obtained with the FDI inflows for the variables EAGR, ESERV, TEDUC, GCF, RDEXP, EAST and CRISIS, FDI net inflows do not show statistically significant coefficients when assessing competitiveness as labor productivity. Differently, when considering the GCI as the dependent variable, the estimation results are very similar to the ones obtained using FDI inflows, with the FDI net inflows' coefficient being negative and statistically significant.

5.5. Discussion of results

Literature on the influence of FDI on countries' competitiveness frequently find that FDI has a positive effect on countries' competitiveness and economic growth (Table 3 and Table 4, chapter 3). Nevertheless, the majority of the empirical studies that address such phenomenon consider mainly developing countries, and this might explain why the results of the present study differ from others. Even though, Simionescu (2016) find that in countries like Austria, Denmark, Estonia, Cyprus, Portugal, Sweden, the UK, Malta and the Netherlands, FDI has a negative impact on economic growth. Additionally, Bakardzhieva *et al*. (2010) finds that FDI has no effect on the real exchange rate, the variable the authors use to measure competitiveness.

The negative impact of FDI on countries' competitiveness might further be explained by the negative effects that FDI may have on host countries, which have been previously discussed in the literature review (see chapter 2.1.), if these effects outweigh the potential positive ones. Thus, FDI inflows may repress competition (Todaro and Smith, 2015; Zhang, 2014), lead to a crowding out of domestic investment (Morrissey and Udomkerdmongkol, 2016), and the management skills and technology associated to

them might have no impact on the host country in case they prevent the growth of indigenous entrepreneurship (Todaro and Smith, 2015).

Furthermore, the effect of FDI inflows on countries' competitiveness may have a different sign if the total factor productivity (TFP) had been used as a measure of competitiveness instead of the labor productivity (*e.g.* Woo, 2009; Krammer, 2015). However, there is no available data for the sample considered regarding the TFP. Indeed, the TFP considers the productivity of both labor and capital, and as FDI is believed to be strongly associated with the transference of technology (Alfaro *et al*., 2006), the effect it has on the improvement of capital productivity may be more significant than the one it has on the increase of labor productivity.

For both estimation results (Table 8 and Table 9, chapter 5.4.), the estimated coefficients obtained for R&D expenditure as a percentage of GDP and for the tertiary educated people on total labor force are positive and in accordance with the results of other empirical studies (*e.g.* Fagerberg *et al*., 2007; Zhang, 2014). This means that an increased expenditure on R&D and population with tertiary education improve countries' competitiveness.

As expected, the employment in the services' sector, the global capital formation and high-technology exports also exert a positive effect on countries' competitiveness. Indeed, a higher employment in services' activities is associated with a higher level of development and productivity and, thus, competitiveness. The same holds true for global capital formation, as it entails more capital accumulation, which can be seen as a higher capacity for production. Finally, high-technology exports have associated the level of technology available and the technological readiness of countries, which increasingly valued internationally, then, directly affecting countries' competitiveness.

Chapter 6. Conclusions

The main goal of this internship report is to find the effect of FDI's inflows and structural change's various dimensions on countries' competitiveness. In the increasingly globalized context of the world economy, countries are, undeniably, fiercely competing with each other (Anastassopoulos, 2007), and many are the governments that are following a strategy of national competitiveness for fostering economic development (Lall, 2001; Ketels, 2006; Berger, 2008). Additionally, the impact of FDI in countries' competitiveness gain more importance in the current economic scenario, in which European countries are still recovering from an economic crisis that has left economies very vulnerable and in need of economic stimulus. Besides investment, and FDI in particular, the literature review shows that structural change may also contribute to improvements in countries' productivities (Lewis, 1954; Abramovitz, 1986; McMillan and Rodrik, 2011).

As stated above, many were the studies undertaken in the last years in order to capture the impact of FDI in both countries' competitiveness and economic growth, which commonly conclude for a positive effect of FDI. However, we conclude for a negative effect of FDI inflows on EU-28 countries' competitiveness for the period between 2002-2014, regardless of the variable chosen to measure competitiveness (*i.e.* labor productivity and GCI).

Many are the causes that may explain this divergence from the other studies, namely the sample, the time period, and the variables considered in each work. Our sample considers the EU-28 countries, which are well-developed and mainly high-income economies, thus, different from the majority of studies that focus on this phenomenon, as they consider either a great number of both developing and developed countries or just developing ones. This argument becomes even more relevant if we take into account that the majority of the benefits of FDI mentioned in the literature correspond to technology transfers, employee's training, or the introduction of new management practices, for example. In fact, these benefits might be of great importance for the development and growth of developing countries, but might not be that relevant for developed and high-income economies, as they already have advanced technologies, a good level of human capital and the latest and most innovative management practices.

Besides that, there are also many authors (*e.g.* Zhang, 2014; Iamsiraroj and Ulubasoglu, 2015; Todaro and Smith, 2015; Morrissey and Udomkerdmongkol, 2016)

that consider the negative impacts that FDI may have on host economies (*e.g*. repression of competition, crowding out of domestic investment, inhibition of the growth of local entrepreneurship). The type of investment that enters the country may also be an explanation for the negative effect of FDI in the EU between 2002 and 2014, and so are its sector, location and scale, for instance.

Regarding the results obtained for the different dimensions of structural change – transference of resources, capital accumulation, and technology and innovation – we were able to conclude that a higher share of people employed in the services' sector, a higher expenditure of R&D, more tertiary educated people, a high global capital formation and a high share of high-technology exports on total exports are associated with an improved competitiveness of countries, which accords to the conclusions of Fagerberg *et al*. (2007) and Zhang (2014), for example.

In terms of policy implications, our results might suggest that governments aiming to increase their competitiveness, or productivity, must focus on improving the different dimensions of structural change, rather than setting efforts and allocating resources in the attraction of FDI inflows. Therefore, efforts should be put in the improvement of countries' education system, so that more tertiary educated labor force is formed. In addition, more resources should be allocated to R&D, which may also improve countries' technological readiness and advancement. These are, then, the main drivers of competitiveness' improvements for countries that are increasingly competing in international markets. Nevertheless, it is important to take into consideration that the type of investment, namely of FDI, that is present on host economies does matter. In particular, MNCs that enter countries and just aim at taking advantage of cheap labor force and do not aim at transmitting technology or training employees is not very beneficial to the host countries.

For future research it is important to try to overcome some of this study's limitations. For that purpose, we would suggest estimating results by measuring productivity using total factor productivity (TFP), because it considers improvements in both labor and capital, and FDI may be more beneficial to improvements in capital productivity (*e.g*. due to advanced technologies) rather than to labor productivity. In this study we were not able to use such variable due to lack of data for the sample considered. Finally, in future research it would also be recommendable to use FDI stocks instead of flows to capture the real impact of FDI, as it is a better measure for the foreign presence, even though in the present study we did not focus on such dimension.

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Appendices

Appendix 1: Variance Inflation Factor (VIF) results – Test for multicollinearity

Variables	Model I	Model II	Model III	Model IV	Model V
			VIF		
FDI	1.38	1.36	1.04	1.07	1.36
EAGR	1.80				
EIND					
ESERV		3.16	2.96		
TEDUC	1.35			1.26	
GCF	1.27	1.33		1.26	
RDEXP	2.00	1.89			1.86
HTE	1.71	1.62			1.61
GIIPS	1.80	1.91	1.42	1.27	1.72
EAST	3.16	4.55	3.43	1.69	2.48
CRISIS	1.04	1.04	1.03	1.02	1.01

Note: significance level at 1% (***), 5% (**) and 10% (*); In order to calculate the VIF, first we need to consider the equation $Y = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_p X_{pi} + E_i$, then estimate: $X_{1i} = \delta_0 + \delta_1 X_{2i} + \delta_2 X_{3i} + \ldots + \delta_p X_{pi}$; $X_{2i} = \delta_0 + \delta_1 X_{1i} + \delta_2 X_{3i} + \ldots + \delta_p X_{pi}$; … (for each equation). The VIF is obtained by considering the R^2 on each equation and calculating $VIF=1/(1-R^2)$ for each of the previous equations. If the value of VIF is equal or lower than 5, we can conclude that the multicolinearity is low and we can include the variable in the regression.

Appendix 2: Estimation results using REM (cross-section random) – Hausman test results (FDI inflows as % of GDP as explanatory variable)

Independent variables	Dependent variable: GDPPE				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	83526.47*** (8663.87)	5219.54 (9615.06)	30989.47*** (8772.71)	72388.55*** (8567.25)	75340.63*** (8152.48)
FDI	-13.87*** (5.00)	-16.59*** (5.22)	-13.65** (5.49)	-16.84*** (5.86)	-13.10** (6.16)
EAGR	-1611.73*** (158.82)				
EIND					
ESERV		955.89*** (81.14)	800.58*** (63.26)		
TEDUC	96.63 (60.87)			531.24*** (54.50)	
GCF	65.28 (52.42)	339.30*** (59.05)		86.37 (58.78)	
RDEXP	3591.34*** (866.29)	2830.68*** (921.86)			7056.03*** (924.68)
HTE	-51.81 (42.72)	66.99 (43.34)			8.49 (50.42)
GIIPS	-710.23 (14739.47)	-1687.75 (13205.76)	-5577.78 (13697.30)	-8421.41 (15147.21)	-4053.21 (14483.72)
EAST	-26735.64** (11603,38)	-24704.94** (10451.35)	-29560.91*** (10784.34)	-39090.24*** (11882.50)	-34193.99*** (11397.06)
CRISIS					
Hausman Test (p-value)	**4.20 (0.6502)**	**6.77 (0.2385)**	**2.13 (0.3445)**	**0.28 (0.9637)**	**2.96 (0.3983)**
R^2	0.4561	0.4065	0.3365	0.2562	0.1787
Adjusted-R^2	0.4439	0.3948	0.3291	0.2458	0.1672
S.E. of regression	2991.12	3154.00	3325.43	3541.38	3723.91
F-statistic	37.22	34.84	45.51	24.66	15.57
Sum squared residuals	0.00	0.00	0.00	0.00	0.00
Durbin-Watson statistics	0.77	0.69	0.71	0.62	0.79

Note: significance level at 1% (***), 5% (**) and 10% (*).

Independent variables	Dependent variable: GCI				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	4.40*** (0.18)	4.10*** (0.34)	4.53*** (0.28)	4.76*** (0.15)	4.73*** (0.11)
FDI	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
EAGR	-0.00 (0.01)				
EIND					
ESERV		0.01* (0.00)	0.01** (0.00)		
TEDUC	0.01*** (0.00)			0.01*** (0.00)	
GCF	0.01* (0.00)	0.01 (0.00)		0.00 (0.00)	
RDEXP	0.16*** (0.04)	0.18*** (0.04)			0.19*** (0.04)
HTE	0.00* (0.00)	0.00 (0.00)			0.00 (0.00)
GIIPS	-0.40*** (0.10)	-0.40*** (0.11)	-0.59*** (0.15)	-0.59*** (0.15)	-0.43*** (0.11)
EAST	-0.52*** (0.09)	-0.48*** (0.10)	-0.67*** (0.13)	-0.75*** (0.12)	-0.56*** (0.09)
CRISIS					
Hausman Test (p-value)	**38.32 (0.0000)**	**35.65 (0.0000)**	**7.77 (0.0206)**	**6.54 (0.0880)**	**27.96 (0.0000)**
R^2	0.3135	0.2865	0.1336	0.1636	0.2798
Adjusted-R^2	0.2980	0.2725	0.1240	0.1519	0.2697
S.E. of regression	0.20	0.21	0.20	0.20	0.21
F-statistic	20.26	20.42	13.84	14.01	27.82
Sum squared residuals	14.82	15.27	14.54	14.05	15.43
Durbin-Watson statistics	1.57	1.51	1.57	1.63	1.49

Note: significance level at 1% (***), 5% (**) and 10% (*).

Appendix 3: Estimation results using REM (cross-section random) – Hausman test results (FDI net inflows as % of GDP as explanatory variable)

Independent variables	Dependent variable: GDPPE				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	84384.64*** (9159.11)	6376.13 (10060.56)	30147.18*** (8684.36)	72752.82*** (8489.75)	75148.78*** (8468.78)
FDI	4.40 (5.13)	4.94 (5.40)	7.23 (5.63)	4.26 (6.01)	3.31 (6.33)
EAGR	-1642.64*** (160.33)				
EIND					
ESERV		942.89*** (82.22)	806.52*** (64.87)		
TEDUC	78.26 (61.20)			519.03*** (54.95)	
GCF	48.48 (52.85)	320.76*** (59.74)		66.93 (59.33)	
RDEXP	3585.97*** (876.00)	2816.52*** (935.78)			7070.70*** (931.31)
HTE	-62.94 (43.26)	56.97 (44.07)			0.24 (50.96)
GIIPS	-454.29 (15705.47)	-1501.29 (14164.54)	-5212.95 (13442.45)	-8120.55 (14984.54)	-3837.46 (15080,98)
EAST	-26416.62** (12358.93)	-24630.87** (11164.96)	-29166.30*** (10586.52)	-38777.10*** (11755.17)	-34017.40*** (11864.40)
CRISIS					
Hausman Test (p-value)	**1.39 (0.9666)**	**3.21 (0.6671)**	**3.11 (0.2108)**	**0.72 (0.8688)**	**0.92 (0.8216)**
R^2	0.4458	0.3908	0.3285	0.2404	0.1677
Adjusted-R^2	0.4333	0.3788	0.3211	0.2298	0.1561
S.E. of regression	3010.60	3182.03	3352.31	3557.47	3737.46
F-statistic	35.69	32.63	43.91	22.66	14.43
Sum squared residual	0.00	0.00	0.00	0.00	0.00
Durbin-Watson statistic	0.78	0.69	0.70	0.60	0.79

Note: significance level at 1% (***), 5% (**) and 10% (*).

Independent variables	Dependent variable: GCI				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	4.41*** (0.18)	4.13*** (0.34)	4.58*** (0.28)	4.77*** (0.15)	4.74*** (0.11)
FDI	-0.00** (0.00)	-0.00** (0.00)	-0.00* (0.00)	-0.00** (0.00)	-0.00** (0.00)
EAGR	-0.01 (0.01)				
EIND					
ESERV		0.01* (0.00)	0.01** (0.00)		
TEDUC	0.01*** (0.00)			0.01*** (0.00)	
GCF	0.01* (0.00)	0.01 (0.00)		0.00 (0.00)	
RDEXP	0.15*** (0.04)	0.18*** (0.04)			0.19*** (0.04)
HTE	0.00** (0.00)	0.00** (0.00)			0.00* (0.00)
GIIPS	-0.41*** (0.10)	-0.41*** (0.11)	-0.60*** (0.16)	-0.60*** (0.15)	-0.44*** (0.11)
EAST	-0.52*** (0.09)	-0.49*** (0.10)	-0.69*** (0.14)	-0.75*** (0.12)	-0.56*** (0.09)
CRISIS					
Hausman Test (p-value)	**36.67 (0.0000)**	**32.77 (0.0000)**	**5.20 (0.0743)**	**5.09 (0.1653)**	**26.31 (0.0000)**
R^2	0.3209	0.2899	0.1378	0.1702	0.2876
Adjusted-R^2	0.3056	0.2759	0.1282	0.1587	0.2777
S.E. of regression	0.20	0.21	0.20	0.20	0.21
F-statistic	20.97	20.76	14.35	14.69	28.91
Sum squared residual	14.56	15.01	14.33	13.87	15.18
Durbin-Watson statistic	1.60	1.54	1.60	1.66	1.52

Note: significance level at 1% (***), 5% (**) and 10% (*).

Appendix 4: Estimation results (FDI net inflows as % of GDP as explanatory variable)

Independent variables	Dependent variable: GDPPE				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	84359.47*** (10137.63)	12381.96 (10814.37)	41829.68*** (9778.97)	74833.31*** (9707.57)	79519.19*** (8965.62)
FDI	3.84 (5.06)	3.91 (5.32)	-0.47 (5.18)	2.71 (5.77)	-3.64 (5.43)
EAGR	-1566.27*** (166.47)				
EIND					
ESERV		872.83*** (85.13)	640.58*** (85.06)		
TEDUC	77.95 (60.34)			443.34*** (55.09)	
GCF	39.15 (52.42)	282.53*** (60.52)		38.58 (57.21)	
RDEXP	3379.72*** (875.09)	2509.40*** (929.21)			3758.75*** (911.70)
HTE	-51.31 (43.27)	67.10 (43.51)			77.52* (43.69)
GIIPS	-880.79 (17664.41)	-2159.59 (15969.86)	-6417.33 (13916.29)	-8487.27 (17345.67)	-6508.88 (16107.68)
EAST	-27057.22* (13894.38)	-25847.89** (12236.03)	-31924.30*** (10989.65)	-39204.17*** (13606.06)	-37137.35*** (12661.76)
CRISIS	534.77 (352.94)	942.63*** (362.74)	1537.53*** (580.42)	1779.99*** (376.43)	2370.30*** (589.32)
R^2	0.4500	0.4016	0.2106	0.2819	0.1295
Adjusted-R^2	0.4361	0.3881	0.1996	0.2698	0.1149
S.E. of regression	2984.64	3136.26	3012.35	3421.01	3145.24
F-statistic	32.19	29.78	19.10	23.36	8.86
Sum squared residual	0.00	0.00	0.00	0.00	0.00
Durbin-Watson statistic	0.80	0.71	0.66	0.69	0.75

Note: significance level at 1% (***), 5% (**) and 10% (*).

Independent variables	Dependent variable: GCI				
	Model I	Model II	Model III	Model IV	Model V
	Coefficient (standard deviation)				
Constant	3.98*** (0.10)	3.42*** (0.21)	4.56*** (0.26)	4.61*** (0.16)	4.42*** (0.06)
FDI	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)	-0.00** (0.00)	-0.00*** (0.00)
EAGR	-0.01*** (0.00)				
EIND					
ESERV		0.01*** (0.00)	0.01*** (0.00)		
TEDUC	0.01*** (0.00)			0.01*** (0.00)	
GCF	0.01*** (0.00)	0.01*** (0.00)		0.01*** (0.00)	
RDEXP	0.31*** (0.02)	0.33*** (0.02)			0.34*** (0.02)
HTE	0.00*** (0.00)	0.00*** (0.00)			0.01*** (0.00)
GIIPS	-0.25*** (0.04)	-0.26*** (0.04)	-0.62*** (0.05)	-0.61*** (0.15)	-0.30*** (0.04)
EAST	-0.33*** (0.04)	-0.30*** (0.06)	-0.70*** (0.07)	-0.80*** (0.12)	-0.39*** (0.04)
CRISIS					
R^2	0.8401	0.8237	0.6414	0.1940	0.8091
Adjusted-R^2	0.8308	0.8140	0.6248	0.1828	0.7997
S.E. of regression	0.22	0.23	0.32	0.14	0.24
Sum squared residual	16.07	17.71	36.04	6.75	19.19
F-statistic	90.11	84.60	38.78	17.24	86.24
Durbin-Watson statistic	0.53	0.53	0.42	1.06	0.52

Note: significance level at 1% (***), 5% (**) and 10% (*); Model IV estimated by REM (Hausman test results – Appendix 3).